

WHAT IS CLAIMED IS:

1. A method for determining an operating frequency of a touch screen unit, the method comprising:

5 providing a first set of sinusoidal signals to a plurality of electrodes of a touch screen, each sinusoidal signal in the the first set of sinusoidal signals having a first frequency;

determining a first value indicative of the amount of current flowing from the plurality of electrodes when the touch screen is not being touched by a person and when the first set of sinusoidal signals is provided to the plurality of the electrodes;

10 providing a second set of sinusoidal signals to the plurality of electrodes of the touch screen, each sinusoidal signal in the second set of sinusoidal signals having a second frequency;

determining a second value indicative of the amount of current flowing from the plurality of electrodes when the touch screen is not being touched by the person  
15 and when the second set of sinusoidal signals is provided to the plurality of the electrodes; and

determining an operating frequency of sinusoidal signals to be provided to the plurality of electrodes based on the first value and the second value.

20 2. A method according to claim 1, further comprising:

providing respective additional sets of sinusoidal signals to the plurality of electrodes at respective times, each sinusoidal signal of each additional set of sinusoidal signals having a respective frequency;

25 for each additional set of sinusoidal signals, determining a respective additional value indicative of the amount of current flowing from the plurality of electrodes when the touch screen is not being touched by a person and when the respective additional set of sinusoidal signals is provided to the plurality of the electrodes;

wherein determining the operating frequency comprises determining the operating frequency of sinusoidal signals to be provided to the plurality of electrodes based on the first value, the second value, and the respective additional values.

5           3.       A method according to claim 2, wherein determining the operating frequency comprises determining a minimum value of the first value, the second value, and the respective additional values; and  
              determining the operating frequency as a frequency corresponding to the minimum value.

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              4.       A method according to claim 3, further comprising  
                  comparing the minimum value to a threshold;  
                  if the minimum value is less than the threshold, determining the operating frequency as a frequency corresponding to the minimum value; and

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                  if the minimum value is greater than the threshold, reducing a level of the first set of sinusoidal signals, the second set of sinusoidal signals, and the additional sets of sinusoidal signals.

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              5.       A method according to claim 2, wherein determining the desired frequency comprises:

                  comparing each one of the first value, the second value, and the additional values to a threshold until one of the first value, the second value, and the additional values is less than the threshold or until none of the first value, the second value, and the additional values are less than the threshold; and

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                  if one of the first value, the second value, and the additional values is less than the threshold, determining the operating frequency as a frequency corresponding to the one of the first value, the second value, and the additional values.

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              6.       A method according to claim 5, further comprising if none of the first value, the second value, and the additional values are less than the threshold, reducing a level of the first set of sinusoidal signals, the second set of sinusoidal signals, and the additional sets of sinusoidal signals.

              7.       A method according to claim 5, further comprising:

if one of the first value, the second value, and the additional values is less than the threshold, not providing ones of the the second set of sinusoidal signals and the additional sets of sinusoidal signals to the plurality of electrodes that have not yet been provided.

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8. A touch screen apparatus, comprising:

a configurable clock generator to generate a clock signal having a configurable clock frequency, the configurable clock generator having an oscillator, a phase locked loop coupled to the oscillator, and a configurable frequency divider coupled to the phase locked loop;

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a sinusoid generator coupled to a plurality of electrodes of a touch screen and coupled to the configurable clock generator, the first sinusoid generator adapted to generate a sinusoidal signal having a frequency based on the clock frequency;

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a plurality of sensors coupled to the plurality of electrodes to generate sensed signals indicative of signals flowing from each electrode of the plurality of electrodes; and

a touch position calculator coupled to the plurality of sensors adapted to generate an estimate of a touch position based on the sensed signals.

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9. A touch screen apparatus according to claim 8, wherein the oscillator is configured to generate an oscillator signal having a frequency  $F$ ;

wherein the configurable frequency divider is configured to generate an output signal having a frequency  $X/N$ , wherein  $X$  is a frequency of a signal input to the configurable frequency divider, and  $N$  is a configurable value; and

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wherein the oscillator is coupled to the configurable frequency divider to generate a signal having a frequency  $F/N$ .

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10. A touch screen apparatus according to claim 8, wherein the oscillator is configured to generate an oscillator signal having a frequency  $F$ ;

wherein the configurable frequency divider is configured to generate an output signal having a frequency  $X/N$ , wherein  $X$  is a frequency of a signal input to the configurable frequency divider, and  $N$  is a configurable value; and

wherein the phase locked loop is coupled to the configurable frequency divider to generate a signal having a frequency  $F \cdot N$ .

5        11.     A touch screen apparatus according to claim 10, wherein the configurable clock generator further includes a first frequency divider coupled to receive an output of the phase locked loop.

10        12.     A touch screen apparatus according to claim 11, wherein the configurable clock generator further includes:  
a second frequency divider coupled to receive an output of the first frequency divider;  
a multiplexer having a first input and a second input, the first input coupled to an output of the first frequency divider and the second input coupled to an output of the second frequency divider.

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13. A method for facilitating game play via a gaming apparatus, the gaming apparatus comprising a value input device, a display unit, and a touch screen unit, the gaming method comprising:

receiving a value input from a player via the value input device;

5 causing the display unit to display a first game display relating to one of the following games: poker, blackjack, slots, keno or bingo;

determining an operating frequency of the touch screen unit;

receiving a game play input from the player via a touch screen of the touch screen unit;

10 determining a value payout associated with an outcome of the game;

wherein determining the operating frequency of the touch screen unit, comprises:

15 providing a first set of sinusoidal signals to a plurality of electrodes of the touch screen, each sinusoidal signal in the the first set of sinusoidal signals having a first frequency;

determining a first value indicative of the amount of current flowing from the plurality of electrodes when the touch screen is not being touched by a person and when the first set of sinusoidal signals is provided to the plurality of the electrodes;

20 providing a second set of sinusoidal signals to the plurality of electrodes of the touch screen, each sinusoidal signal in the second set of sinusoidal signals having a second frequency;

25 determining a second value indicative of the amount of current flowing from the plurality of electrodes when the touch screen is not being touched by the person and when the second set of sinusoidal signals is provided to the plurality of the electrodes; and

determining an operating frequency of sinusoidal signals to be provided to the plurality of electrodes based on the first value and the second value.

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14. A gaming apparatus, comprising:

a display unit;

a value input device;

a touch screen unit including:

5                   a configurable clock generator to generate a clock signal having a configurable clock frequency, the configurable clock generator having an oscillator, a phase locked loop coupled to the oscillator, and a configurable frequency divider coupled to the phase locked loop;

10                   a sinusoid generator coupled to a plurality of electrodes of a touch screen and coupled to the configurable clock generator, the first sinusoid generator adapted to generate a sinusoidal signal having a frequency based on the clock frequency;

15                   a plurality of sensors coupled to the plurality of electrodes to generate sensed signals indicative of signals flowing from each electrode of the plurality of electrodes; and

                  a touch position calculator coupled to the plurality of sensors adapted to generate an estimate of a touch position based on the sensed signals.

20                   a main controller operatively coupled to the display unit, the value input device, and the touch screen unit, the main controller comprising a main processor and a main memory operatively coupled to the main processor,

                  the main controller being programmed to receive value input data via the value input device,

25                   the main controller being programmed to cause the display unit to generate a first game display relating to one of the following games: poker, blackjack, slots, keno or bingo,

                  the main controller being programmed to receive player input data via the touch screen unit,

                  the main controller being programmed to determine a value payout associated with an outcome of the game.

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15. A gaming apparatus according to claim 14, wherein the main controller is further programmed generate the estimate of the touch position based on estimates of amplitudes of the sensed signals.

5 16. A gaming apparatus according to claim 14, wherein the main controller is further programmed to control the configurable clock frequency of the configurable clock generator.

10 17. A gaming apparatus according to claim 14, wherein the touch screen unit comprises a touch screen controller operatively coupled to the main controller, the touch screen controller comprising a touch screen processor and a touch screen memory operatively coupled to the touch screen processor, the touch screen controller being programmed to generate the estimate of the touch position based on estimates of amplitudes of the sensed signals.

15 18. A gaming apparatus according to claim 14, wherein the touch screen unit comprises a touch screen controller operatively coupled to the configurable clock generator, and the main controller, the touch screen controller comprising a touch screen processor and a touch screen memory operatively coupled to the touch screen  
20 processor, the touch screen controller being programmed to control the configurable clock frequency of the configurable clock generator.